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Superior Energy Performance™

Aimee McKane, LBNL

Silicon Valley Manufacturing Meeting

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Value of Energy Management

Many organizations consume more energy than necessary because:

- *Data* on energy use and consumption *is either lacking or underutilized*
- Energy- efficiency *projects don't get implemented* due to other priorities
- Implemented projects *do not meet energy savings goals*
- *Energy savings is not sustained* due to operational and maintenance practices
- The only constant in the life of most organizations is *change*

  -management, priorities, physical assets, technology, personnel

How can this be improved?

Root Cause: ***Energy efficiency is not integrated into daily management practices***

Solution: ***Engage the entire organization in a system for managing energy***

Energy Management System (EnMS)

Energy management requires an organization to shift from a project-by-project approach to one of continual improvement in energy performance

Scope of an EnMS

Benefits of an EnMS

Implementing an EnMS produces a *change in culture,* allowing an organization to:

- *Achieve energy savings* across the organization from no-and low-cost operational improvements- and sustain them
- *Develop and integrate business processes* for managing energy into existing management processes
- *Evaluate what works* to improve energy performance based on hard data--and build on it
- *Provide a context for informed decisions* concerning proposed energy efficiency projects, including new technologies.
- *Increase reliability of outcomes* and adaptation to future changes - emphasis on management processes rather than a few individuals.
- *Involve energy users and decision makers*, not just facility personnel and physical systems, to *sustain the change.*

ISO 50001:2011 Energy management systems

- American National Standards Institute and US Department of Energy led ISO 50001 development
- Published in 2011; input from 56 countries (now 74)
- New international best practice in energy management
- Emphasis on collection and analysis of *available* energy data to support and improve
  - energy performance
  - energy-related decision-making
- Flexible and limited documentation requirements– focus is on energy performance improvement
- Applicable to any organization

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http://www1.eere.energy.gov/energymanagement/

International Organization for Standardization

http://www.iso.org/iso/home/standards/management-standards/iso50001.htm

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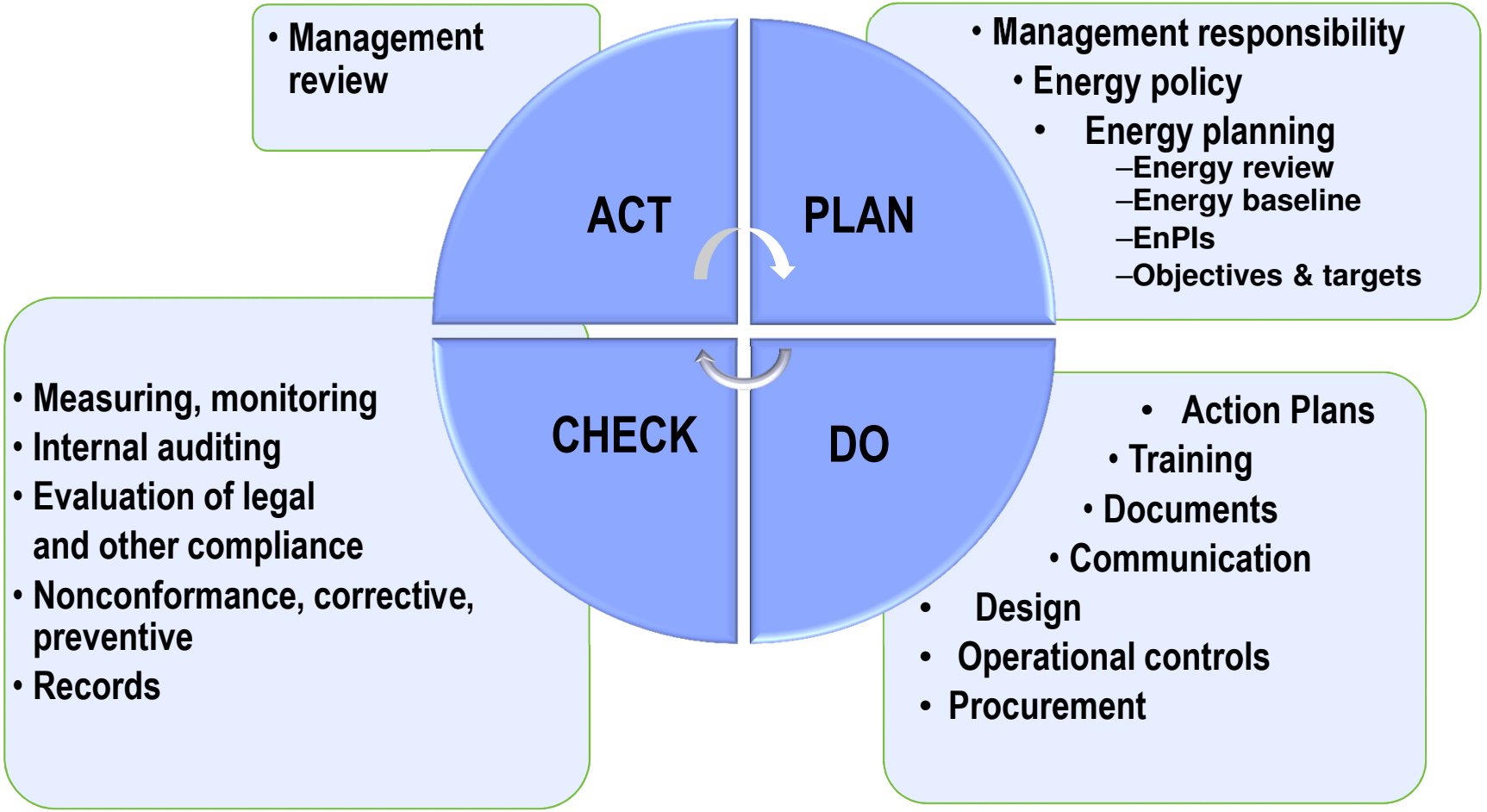
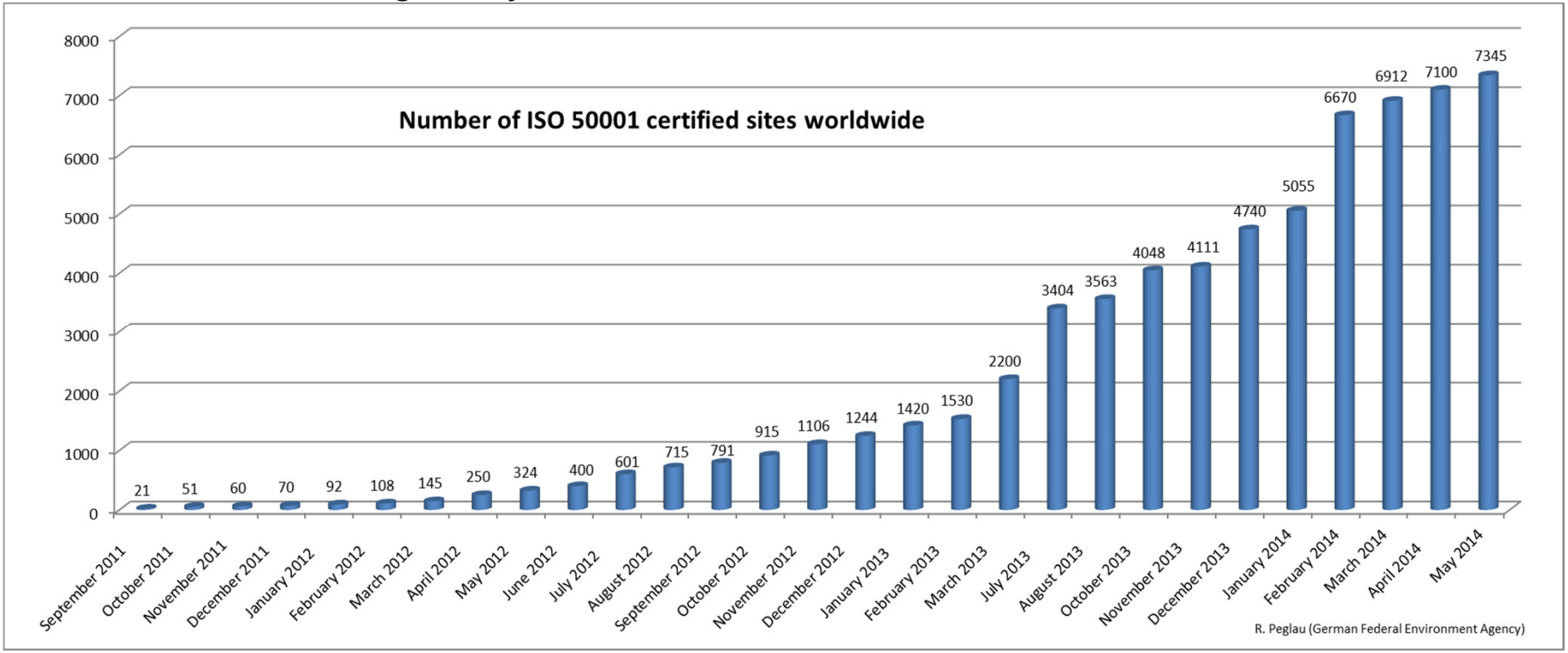
ISO 50001 Energy Management System



Based on Deming's Plan-Do-Check-Act cycle

ISO 50001 Certifications Worldwide

Nov. 2011 through May 2014



7,345 certified sites worldwide as of May 30.

Number of global ISO 50001 certified sites has increased by 234% over the past 14 months (March 2013 to May 2014).

City of London- ISO 50001 Implementation

1975- began actively managing energy use and consumption

1985- established an energy team

1995- implemented monitoring processes

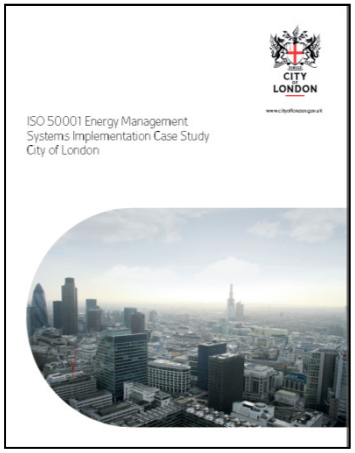
2009- Carbon Descent Plan established 15% energy reduction target by 2015

~2012- initiated implementation of ISO 50001

- Interest in benchmarking the City to energy management best practices
- Establishing accountability for energy use among senior management
- Piloting ISO 50001 in Guildhall complex, extending to additional sites

"For those who have a level of experience and are looking to improve and embed good energy management, ISO 50001 could be invaluable, especially for local authorities that can have very bold targets on carbon emissions, but have a huge gulf between the aspiration and the practicalities of implementation."

-Paul Kennedy, Energy Manager



ISO 50001 – Flexible Approach

- ISO 50001 is designed to be a *very flexible* management system
- Encourages organizations to *focus their efforts* where they are most likely to produce improvement in energy performance
  - Start with 1-2 significant energy uses and build on your success
  - Less emphasis on documented procedures
  - More emphasis is on *effective use of available* metering and analysis to better understand operations- turning data into usable, actionable information
- Does *not* require capital investments to be achieve good results
- Does *not* require certification in order to achieve results- that is business decision
- *Does* require engagement across the organization and improved energy performance ongoing.

Top management support is essential to success!

Superior Energy Performance™

Superior Energy Performance ™ (SEP)

- Adds an energy performance improvement target to ISO 50001 requirements
- Rigorous, data-driven approach
- Includes ISO 50001 certification
- Third-party verification by ANSI-ANAB accredited entity
- Savings persist and grow, even as operations change
- High-level credibility and DOE recognition

ISO 50001 is a foundational tool that any organization can use to manage energy.

ISO 50001

Components in place:
- Top Management
- Energy Team
- Policy
- Planning
- Baseline
- Performance Metrics

Superior Energy Performance

Single facility ISO 50001 conformance with verified energy performance improvement

ISO 50001

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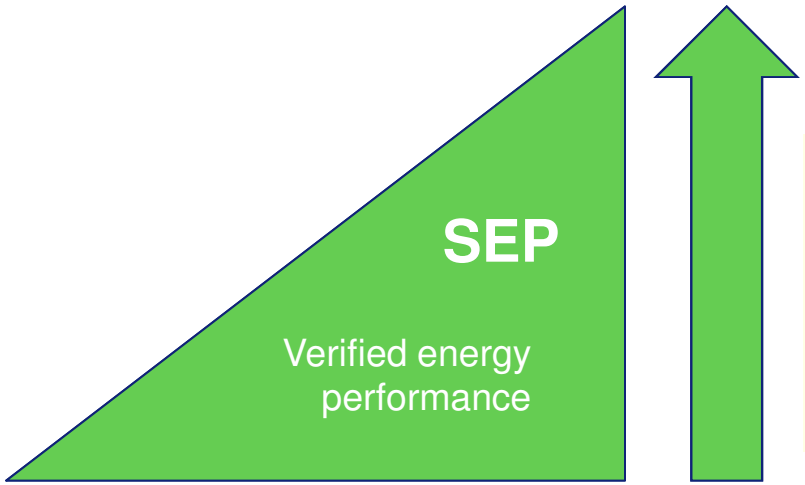
SEP Measurement & Verification Protocol



SEP requires a facility to determine its energy performance improvement with the

SEP Measurement and Verification Protocol for Industry

The SEP M&V Protocol is used by:

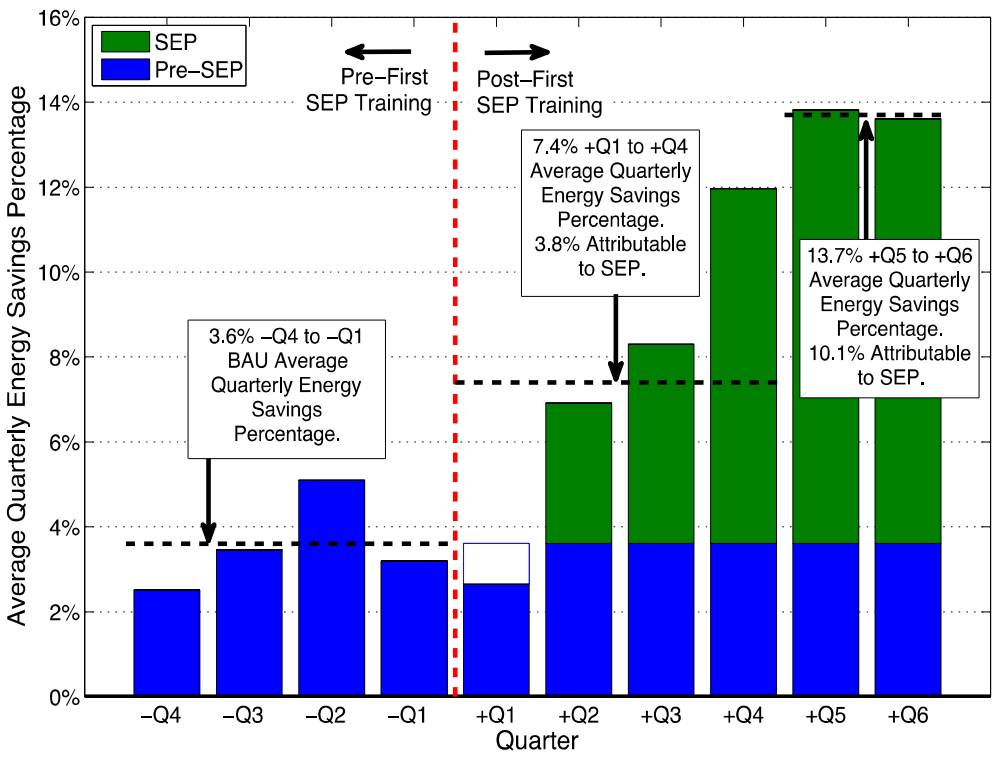
- Facilities – to conduct data collection, analysis, and documentation to show conformance with SEP requirements
- The SEP Audit Team – to confirm a facility's conformance to SEP requirements

SEP Results

Data and Metrics: Making the Business Case

Recent LBNL study: Nine industrial facilities certified to Superior Energy Performance have:

- Improved their energy performance by more than 10% per year over business-as-usual in the first 18 months of SEP implementation
- Saved an average $503,000/yr. from ***operational improvements alone*** (low/no cost investment) attributable to SEP



View full study at: http://www.superiorenergyperformance.energy.gov/pdfs/sep_costbenefits_paper13.pdf

Superior Energy Performance Certified Plants

Energy Performance Improvement Achievement Period

3 years

Facility Name	Sector	Improvement*
Volvo Trucks, NA *Dublin, VA*	Transp. Equipment	**25.8%**
Dow Chemical Company *Texas City, TX:*	Chemicals	**17.1%**
HARBEC Inc. *Ontario, NY*	Plastics & Rubber	**16.4%**
Schneider Electric *Seneca, SC*	Electrical Equipment	**15.6%**
Schneider Electric *Smyrna, TN*	Electrical Equipment	**15.3%**
3M Canada Company *Brockville, Ontario*	Forest Products	**15.2%**
CCP Composites US LLC *Houston, TX*	Chemicals	**13.0% - recertification**
Cummins *Rocky Point, NC*	Machinery Manufacturing	**12.6%**
General Dynamics *Scranton, PA*	Fabricated Metals	**11.9%**
Allsteel *Muscatine, IA*	Furniture & Related Products	**10.2%**
Cooper Tire *Texarkana, AR*	Plastics & Rubber	**10.1%**
Olam Spices *Gilroy, CA*	Food and Beverage	**9.8%**
Owens Corning *Waxahachie, TX*	Nonmetallic Minerals	**9.6%**
Schneider Electric *Cedar Rapids, IA*	Electrical Equipment	**8.8%**
Dow Chemical Company *Texas City, TX: Energy sys.*	Chemicals	**8.1%**

List continues on the next slide

Superior Energy Performance Certified Plants (continued)

Energy Performance Improvement Achievement Period

	Facility Name	Sector	Improvement*
3 years	**Nissan, NA** *Smyrna, TN*	Transp. Equipment	**7.2%**
	Schneider Electric *Lexington, KY*	Electrical Equipment	**6.8%**
	Freescale Semiconductor, Inc. *West Austin, TX*	Computers & Electronics	**6.5%**
	Schneider Electric *Lincoln, NE*	Electrical Equipment	**6.5%**
	3M Company *Cordova, IL*	Chemicals	**6.2%**
10 years	**Mack Trucks** *Macungie, PA*	Transp. Equipment	**41.9%**
	Bridgestone Americas Tire *Wilson, NC*	Plastics & Rubber	**16.8%**

SEP Achievement Levels (over baseline during 3 year achievement period):

- Silver ≥ 5%
- Gold ≥ 10%
- Platinum ≥ 15%

Nissan Case Study: >$900K Savings, 4 Month Payback

- **SEP Silver Certified**: Smyrna, TN vehicle assembly plant
- 7.2% improvement in energy performance over 3 years
- $928,000 total annual energy savings
- 4 month payback
- Used the DOE EnPI Tool to measure and track improvements

"SEP adds rigor, analysis, and gives good guidance. It's one thing to have a target and objective, but SEP gives tools that empower you to be more disciplined and prove the impact certain activities have."

-Nissan North America Energy Team

General Dynamics Case Study: >$900K Savings, 6 Mo Payback

- SEP Gold Certified: Scranton, PA facility. First U.S. defense contractor to be SEP and ISO 50001 certified
- 11.9% improvement in energy performance over 3 years
- $956,000/year operational savings
- $255,000 cost to implement SEP
- 6 month payback

"SEP brought to light many energy intensity savings opportunities that were previously hard to justify. With the EnMS system in place and metering instruments installed, it is much easier to justify improvement projects, and management is more receptive to these proposals."

- Stephen Cannizzaro, Sustainability Manager

See the case study at: http://superiorenergyperformance.energy.gov/successes_and_testimonials.html

Harbec Plastics Case Study: 16.5% improvement

Harbec Plastics' President, Bob Bechtold, and Energy Team Amy Bechtold and Jeff Eisenhauer at their Ontario, NY, facility.

- **SEP Platinum Certified**: Ontario, NY, facility
- Improved energy performance by 16.5%
- EnMS implementation resulted in $52,000 in annual savings through operational improvements ***with no capital investment***
- SEP is the organizing framework in driving the company's goal to be a ***carbon-neutral company***
- Adopted a CHP system and two wind turbines
  - ISO 50001/SEP strengthens management of this equipment, increasing the benefits gained

"We are wary of statements of intent, but third-party verification under SEP provides evidence of proven energy savings. Without verification, stated savings are just a nice statement."

- Bob Bechtold, President

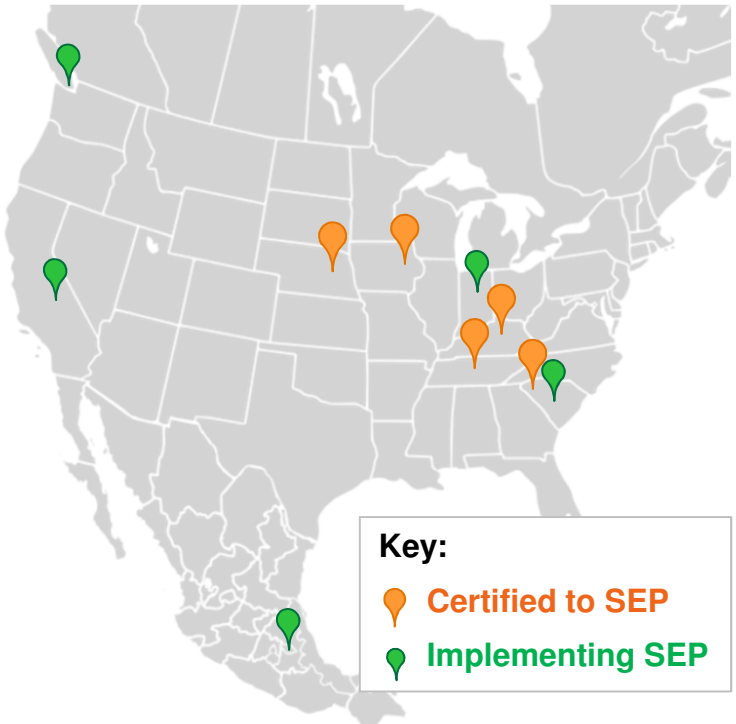
CCP Composites US LLC

Energy Team at CCP Composites US LLC in Houston, a synthetic resin manufacturing plant

- **SEP Gold Certified:** Houston, TX, facility (CCP was SEP Certified Gold in 2010, and recertified in 2013)
- Improved energy performance by 13.0% over 3 years
- EnMS implementation resulted in $87,000 in annual operational improvement savings ***with no capital investment***
- Energy management is now a key part of the company corporate culture
  - Cost savings provide competitive edge in low-margin industry

"Nearly all our energy efficiency projects are now at least influenced, if not initiated as a result of SEP participation. Prior to SEP, we would not have thought to be more energy efficient; it was not part of our corporate culture."
- CCP Composites US LLC

Schneider Electric: Company Commitment



Map data points are intended for illustrative purposes only.

- **SEP Platinum Certified**: Smyrna, TN facility
- Improved energy performance by 15.3% over 3 years
- Facility did not add any staff to support SEP implementation.
- Smyrna's success is driving Schneider Electric to ***implement SEP across 9 additional facilities***

"At first, we didn't appreciate the value of third party verification, but our facility has evolved to value it as critical. Any facility can claim energy savings, but a third party verification proves the savings to be real."

- Schneider Electric, Smyrna, TN

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Unexpected Findings

Working with SEP-certified facilities, DOE gained valuable insights that challenged initial assumptions.

- **Industry values third-party verification:**
  - Facilities were not hesitant to pursue a third-party audit.
  - Credibility from third-party verification was a key motivation for pursuing SEP certification.
  - The results provided more value internally within the company on the value of EnMS.
- **Prior management system experience has a greater influence on a facility's success with ISO 50001 and SEP:**
  - Experience with energy efficiency was not the only factor for success with SEP.
  - Plants with existing ISO management systems, but nascent energy programs, were also successful with achieving SEP certification.

DOE AMO Energy Resources Center

Tools to Manage your Energy Use

- DOE eGuide for ISO 50001
- DOE eGuide Lite
- Strategic Energy Management (SEM) Checklist

http://www1.eere.energy.gov/manufacturing/tech_assistance/ecenter.html

Conclusion: Benefits of SEP Noted by End Users

- **Rigor:**
  - Improves measurement of energy performance by manufacturing processes
  - Helps uncover new savings opportunities, including those that are low/no cost
- **Focus of process energy savings:**
  - Engages process engineers in energy management
  - Raises awareness of energy savings potential on the process vs. equipment side of manufacturing
- **The business case:**
  - Gives plant managers top-level metrics on the bottom-line business value
  - Yields accurately calculated and validated savings numbers that plant managers can present to management with confidence.

For More Information

Web Resources:

- Energy management and ISO 50001

http://industrial-energy.lbl.gov/

- Superior Energy Performance:

http://energy.gov/eere/amo/superior-energy-performance

LBNL Contacts:

Aimee McKane
atmckane@lbl.gov

Peter Therkelsen
ptherkelsen@lbl.gov

Prakash Rao
prao@lbl.gov

DOE Contact:

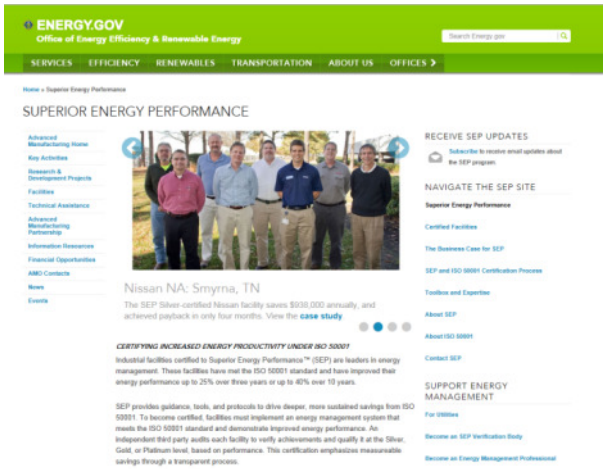
Paul Scheihing
Technology Manager, Advanced Manufacturing Office
US Department of Energy
paul.scheihing@ee.doe.gov

Certification Process

SEP Certification Process: Enroll

Enroll with the SEP Administrator and streamline the SEP implementation process

- Gain access to program updates, tips, and phone support.
- **No fees or commitment are required.** Simply provide some basic facility and contact information to stay connected to the latest information on ISO 50001 and SEP.
- Download the enrollment form from the SEP website and sign up today.
- Learn more about SEP and ISO 50001: **http://energy.gov/eere/amo/superior-energy-performance**



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SEP Certification Process: Prepare

Prepare your facility to establish an EnMS that meets ISO 50001

- Implement an EnMS using the DOE eGuide and other technical resources available on the SEP website
- The DOE eGuide is a web-based toolkit that provides step-by-step guidance, checklists, templates, forms, and examples to assist your team throughout the EnMS implementation process https://ecenter.ee.doe.gov/EM/SPM/Pages/Home.aspx
- Review SEP certification requirements
- Access the SEP standards and protocols

SEP Certification Process: Apply

Apply when your facility meets SEP requirements and is ready for the audit

- Currently, no fees are charged for applying to SEP
- Download the SEP Application form from the SEP website and submit it to the SEP Administrator.
- The SEP Administrator will review applications to assure completeness and notify you when the application is approved.
- Approved applications are sent to the SEP Verification Body designated by the facility.

SEP Certification Process: Verify

Verification involves the audit process to become certified to SEP

- The SEP Verification Body that you selected will send an audit team to conduct the two-stage audit.
  - Stage 1: readiness review to confirm preparedness (conducted on-site or remotely)
  - Stage 2: an SEP Lead Auditor and SEP Performance Verifier(s) will visit the facility to determine whether its EnMS conforms to ISO 50001 and SEP requirements and to verify the energy performance improvement
- Post-audit: SEP and ISO 50001 certificates are issued.
- SEP certification is valid for 3 years